AUTOMOTIVE

RoHS

COMPLIANT

HALOGEN

FREE



## Vishay General Semiconductor

# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifiers

#### eSMP® Series



SMF (DO-219AB)

Cathode O Anode

#### LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS                              |                |  |  |
|--|----------------|--|--|
| I <sub>F(AV)</sub>                                   | 3.0 A          |  |  |
| V <sub>RRM</sub>                                     | 45 V           |  |  |
| I <sub>FSM</sub>                                     | 50 A           |  |  |
| $V_F$ at $I_F = 2 \text{ A } (T_A = 125 \text{ °C})$ | 0.43 V         |  |  |
| T <sub>J</sub> max.                                  | 150 °C         |  |  |
| Package  | SMF (DO-219AB) |  |  |
| Circuit configuration                                | Single         |  |  |

#### **FEATURES**

- Trench MOS Schottky technology
- Low profile package
- Ideal for automated placement
- Low forward voltage drop, low power losses
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Wave and reflow solderable
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Compatible to SOD-123W package case outline
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>

#### TYPICAL APPLICATIONS

For use in high frequency inverters, freewheeling, DC/DC converters, and polarity protection in commercial, industrial, and automotive applications.

#### **MECHANICAL DATA**

Case: SMF (DO-219AB)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

Base P/NHM3 - halogen-free, RoHS-compliant, and

AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per

J-STD-002 and JESD 22-B102

M3 and HM3 suffix meet JESD 201 class 2 whisker test

Polarity: color band denotes the cathode end

| MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)                    |                        |             |      |  |
|--|------------------------|-------------|------|--|
| PARAMETER  |                        | V3FL45      | UNIT |  |
| Device marking code  |                        | 3LE         |      |  |
| Maximum repetitive peak reverse voltage  |                        | 45          | V    |  |
| Maximum average forward rectified current (fig.1)                                  | I <sub>F(AV)</sub> (1) | 2.5         | А    |  |
|  | I <sub>F(AV)</sub> (2) | 3.0         |      |  |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load |                        | 50          | А    |  |
| Operating junction temperature range   |                        | -40 to +150 | °C   |  |
| Storage temperature range  |                        | -55 to +150 |      |  |

#### **Notes**

- (1) Free air, mounted on FR4 PCB, 2 oz. standard footprint
- (2) Mounted on FR4 PCB, 2 oz.10 mm x 10 mm copper pad area
- $^{(3)}$  The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$



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| <b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted) |                        |   |                               |      |      |      |
|---|------------------------|---|-------------------------------|------|------|------|
| PARAMETER   | TEST C                 | ONDITIONS   | SYMBOL                        | TYP. | MAX. | UNIT |
| Instantaneous forward voltage   | I <sub>F</sub> = 1.5 A | T <sub>A</sub> = 25 °C                            | V <sub>F</sub> <sup>(1)</sup> | 0.44 | -    | - V  |
|   | I <sub>F</sub> = 3.0 A |   |                               | 0.50 | 0.58 |      |
|   | I <sub>F</sub> = 1.5 A | T <sub>A</sub> = 125 °C                           |                               | 0.34 | -    |      |
|   | I <sub>F</sub> = 3.0 A |   |                               | 0.43 | 0.51 |      |
| Reverse current   | V <sub>R</sub> = 45 V  | T <sub>A</sub> = 25 °C<br>T <sub>A</sub> = 125 °C | I <sub>R</sub> <sup>(2)</sup> | -    | 0.75 | - mA |
|   | v <sub>R</sub> = 45 v  |   |                               | 4    | 15   |      |
| Typical junction capacitance  | 4.0 V, 1 MHz           |   | CJ                            | 370  | -    | pF   |

#### Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 5 ms

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °c unless otherwise noted) |                         |        |              |  |
|---|-------------------------|--------|--------------|--|
| PARAMETER   | SYMBOL                  | V3FL45 | UNIT         |  |
| Typical thermal resistance  | R <sub>0JA</sub> (1)(2) | 125    | °C/W         |  |
|   | R <sub>eJM</sub> (3)    | 18     | G/ <b>VV</b> |  |

#### **Notes**

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta,JA}$
- $^{(2)} \ \, \text{Device mounted on FR4 PCB, 2 oz. standard footprint, thermal resistance } \, R_{\theta JA} \, \, \text{junction-to-ambient}$
- $^{(3)}$  Device mounted on 10 mm x 10 mm pad size area footprint; thermal resistance  $R_{\theta JM}$  junction-to-mount

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V3FL45-M3/H                    | 0.015           | Н                      | 3000          | 7" diameter plastic tape and reel  |
| V3FL45-M3/I                    | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |
| V3FL45HM3/H (1)                | 0.015           | Н                      | 3000          | 7" diameter plastic tape and reel  |
| V3FL45HM3/I (1)                | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |

#### Note

(1) AEC-Q101 qualified



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### RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)

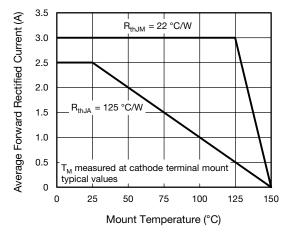


Fig. 1 - Maximum Forward Current Derating Curve

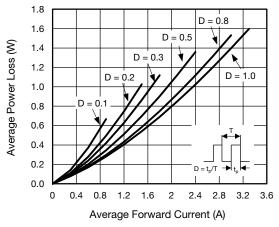


Fig. 2 - Average Power Loss Characteristics

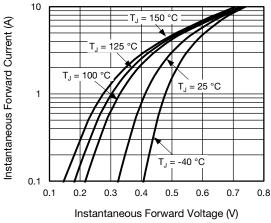


Fig. 3 - Typical Instantaneous Forward Characteristics

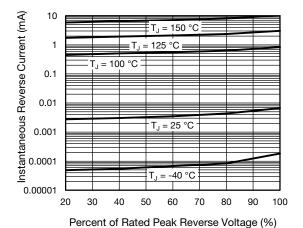


Fig. 4 - Typical Reverse Leakage Characteristics

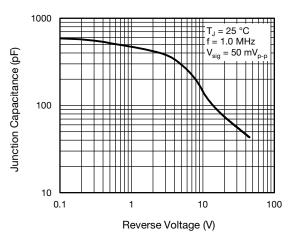


Fig. 5 - Typical Junction Capacitance

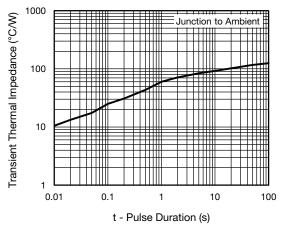
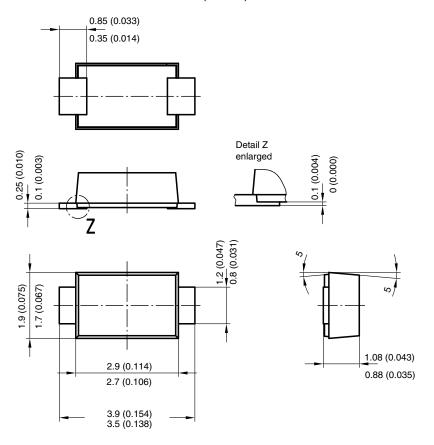


Fig. 6 - Typical Transient Thermal Impedance

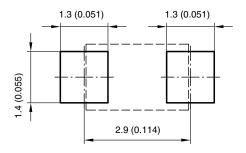


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### **PACKAGE OUTLINE DIMENSIONS** in millimeters (inches)



Foot print recommendation:



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17247



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